

In the Claims:

Please (a) rewrite Claims 4, 7, 10~12, 14 and 15; and (b) cancel Claim 13 without prejudice or disclaimer of the subject matter thereof.

The requested amendments to Claims 4, 7, 10~12, 14 and 15 are shown in the attached Appendix A (pages 7~8) in a marked-up version of those claims, as required by 37 CFR §1.121(c)(1)(ii). Deletions are shown by strike-through, and additions are shown by underlining. The effect of the incorporation of the requested amendments into Claims 4, 7, 10~12, 14 and 15 is shown in a clean version of those claims, as required by 37 CFR §1.121(c)(1)(i). The clean version of Claims 4, 7, 10~12, 14 and 15 is shown in the attached Appendix B (pages 9~10).

**Remarks: General**

The claims have been amended by rewriting Claims 4, 7, 10~12, 14 and 15; and canceling Claim 13 without prejudice or disclaimer of the subject matter thereof. Support in the specification for certain claim elements that have been added to the claims is as follows:

in Claim 4, the reference to  $\beta$  structure may be found on page 8 at lines 28~32;

in Claims 4 and 12, the reference to cristobalite structure may be found on page 7 at line 17;

in Claims 4, 14 and 15, the reference to stable fit within the interstices of the cristobalite structure may be found on page 7 at lines 16~17;

in Claim 7, a step of heating may be found on page 4 at line 8; and

in Claim 12, the recitation of single phase incorporates therein the limitation of Claim 13, which has been canceled.

The amendments to Claims 4, 7, 10, 11, 14 and 15 are made for the purpose of addressing the Examiner's rejection thereof under 35 U.S.C. 112. The amendment to Claim 12 is made for the purpose of removing from the scope thereof the compositions of Hu, which are not single phase.

New drawings for Figs. 3a, 4a, 7a and 7b are submitted.

A petition under 37 CFR §1.136 for a two-month extension of time to respond the Examiner's action is enclosed, the fee for which should be charged to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company). If any fee other than or in addition to this extension fee is required to authorize or obtain consideration of this response, please charge such fee to Deposit Account No. 04-1928.

Claims 1~12 and 14~17 are now active in the application. Applicant hereby requests reconsideration and further examination of the application in view of the reasons it has set forth below for allowance of the claims.

**Remarks: Detailed Action**

I.

The Examiner has objected to Figs. 3a, 4a, 7a and 7b. New drawings for these figures that have greater clarity are submitted herewith, in view of which Applicant respectfully requests the Examiner to withdraw the objection.

II.

The Examiner has objected to the disclosure because of the statement on page 6 at lines 2~3 that the structural integrity of the single phase ceramics is maintained up to at least 1000°C.

In addition to the cited statement, however, the disclosure also states, on page 5 at lines 36~37, that the composition exhibits the structural characteristics of the high temperature  $\beta$  phase; and states, on page 9 at lines 5~6, that the ceramic exhibits high temperature ceramic phase properties. Applicant submits that the artisan would know what the structural characteristics of the high temperature  $\beta$  phase are, and would know what high temperature ceramic phase properties are. Applicant therefore further submits that the statement concerning temperatures up to at least 1000°C would be read by the artisan in conjunction with knowledge of high temperature  $\beta$  phase and ceramic phase properties, and the artisan would understand that the disclosed composition is not being described as having structural integrity at infinitely high temperatures but rather is being described as having structural integrity at

temperatures characteristic of other known high temperature  $\beta$  phase and ceramic materials. Applicant therefore submits that no correction of the disclosure is required.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the objection to the disclosure.

### III.

The Examiner has rejected Claims 4, 6, 7, 10, 11, 14 and 15 under 35 U.S.C. §112, first paragraph, as containing subject matter not described in the specification.

Claims 4, 6 and 14 have been amended to provide that the cation having an atomic radius of about 1 angstrom is a cation that fits stably within the interstices of the cristobalite structure. Applicant submits that it is not necessary to list in the disclosure every cation that meets such condition, and that the artisan, once having learned the applicable size conditions from the disclosure, would be able to determine suitable alternatives to the cations named without undue experimentation.

In Claims 7, 10 and 11, the recitation of molar amounts has been changed to be amounts of compounds rather than amounts of elements.

Claim 15 has been amended to provide a recitation that the dopant is CaO rather than that the dopant comprises CaO.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw this rejection of Claims 4, 6, 7, 10, 11, 14 and 15 under 35 U.S.C. §112.

### IV.

The Examiner has rejected Claims 7-9 under 35 U.S.C. §112, first paragraph, with respect to enablement of recitations as to (i) pH and (ii) calcium oxide source.

(i) Claim 7 has been amended in step (b) to delete the recitation of raising the pH.

(ii) The application teaches the artisan of the usefulness of sources of calcium oxide other than calcium oxide itself, and provides calcium nitrate as a typical example thereof. Applicant therefore submits that, once having learned of the usefulness of sources of calcium oxide other than calcium oxide itself (such as calcium nitrate), and once having learned of the manner in which the calcium oxide source is used in the claimed process, the artisan would be able to select a suitable source of calcium oxide without undue experimentation.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 7~9 under 35 U.S.C. §112.

V.

The Examiner has rejected Claims 4, 6, 7, 14 and 16 under 35 U.S.C. §112, second paragraph, as being indefinite.

As to Claims 4, 6 and 14, Applicant submits that, as discussed above, with the addition to Claims 4 and 14 of a recitation as to stable fit of the cation within the interstices of the cristobalite structure, the artisan would not find the limitation "about 1 angstrom" indefinite, and would be able to select a cation of appropriate size without undue experimentation.

In Claim 7, a step of heating has been added.

As to Claim 16, Applicant submits that, as discussed above, the artisan would read the disclosure as a whole, and would understand that the recitation of "up to at least 1000°C" is not to be interpreted as a recitation of an infinitely high temperature but rather is to be interpreted as a temperature in the range at which other known high temperature  $\beta$  phase and ceramic materials have structural integrity.

In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 4, 6, 7, 14 and 16 under 35 U.S.C. §112.

VI.

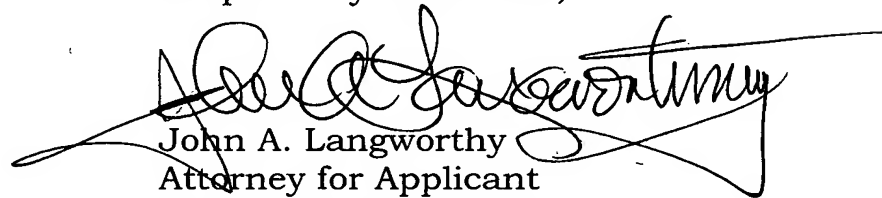
The Examiner has rejected Claims 12~14, 16 and 17 under 35 U.S.C. §102 as being anticipated by WO 92/00929 ("Hu"). Claim 13 has been canceled.

Hu discloses a mixed phase material containing a mixture of the  $\beta$  phase with other materials – secondary amorphous and crystalline phases. The discussion on page 7 at line 30 to page 8 at line 8, for example, acknowledges the presence of tridymite. The materials of Hu are thus not single phase materials. The composition of Claim 12 is, by contrast, a single phase composition.

In view of the distinctions as discussed above between Hu and the subject matter of Claims 12, 14, 16 and 17, Applicant respectfully requests that the Examiner withdraw the rejection of those claims under 35 U.S.C. §102.

In view of the foregoing, Applicant submits that all of the Examiner's objections and rejections have been properly traversed, and that the pending claims are in condition for allowance, request for which is hereby respectfully made.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John A. Langworthy", is written over a horizontal line. The signature is stylized and cursive.

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Appendix A  
**Marked-Up** Version  
(Showing Amendments to)  
Claims 4, 7, 10~12, 14 and 15

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4. (once amended) A stabilized  $\text{AlPO}_4$  composition having a  $\beta$  cristobalite structure, and comprising XO,  $\text{SiO}_2$  and  $\text{AlPO}_4$  at a ratio of greater than 0 to less than about 4 mole percent XO, greater than 0 to less than about 10 mole percent  $\text{SiO}_2$ , and greater than about 86 to less than about 100 mole percent  $\text{AlPO}_4$ , wherein X is any cation with an atomic radius of about 1 angstrom that fits stably within the interstices of the cristobalite structure.

7. (once amended) A method for stabilizing  $\text{AlPO}_4$  ceramic microstructures comprising the steps of:

a) admixing an acidic solution of  $\text{AlPO}_4$  to solutions of  $\text{SiO}_2$  and a calcium oxide source wherein the mole percent ratios are greater than about 86 to less than about 100  $\text{AlPO}_4$ , greater than 0 to less than about 10  $\text{SiO}_2$ , and greater than 0 to less than about 4 calcium oxide source;

b) ~~raising the pH of the admixture to forming~~ a slurry from the admixture formed in step (a); and

c) removing water from the slurry formed in step (b) to form thea precipitate; and

d) heating the precipitate.

10. (once amended) The method of Claim 7, 8 or 9 wherein the mole percent ratios are 0 to about 3 Cacalcium oxide source, 0 to about 6  $\text{SiO}_2$ , and about 91 to about 100  $\text{AlPO}_4$ .

11. (once amended) The method of Claim 7, 8 or 9 wherein the mole percent ratios are about 2.3 Cacalcium oxide source, about 5.7  $\text{SiO}_2$ , and about 92  $\text{AlPO}_4$ .

12. (once amended) A single phase, cristobalite  $\text{AlPO}_4$  composition that has a cubic structure, space group F-43m, with a ~ 7.2 Angstroms at a temperature of less than about 270°C.

14. (once amended) A composition according to Claim 12 comprising a silica dopant, and a dopant having a cation with an atomic radius of about 1 angstrom that fits stably within the interstices of the cristobalite structure.

15. (once amended) A composition according to Claim 14 wherein the dopant having a cation with an atomic radius of about 1 angstrom comprises that fits stably within the interstices of the cristobalite structure is CaO.